

PRELIMINARY NOTES ON THE  
STRUCTURE OF STIGMATIC SURFACES  
IN THE BEGONIACEAE

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In the botanical literature to date, very little or nothing has been said about the micro-structure of the stigmatic surfaces in the Begoniaceae. However, my recent studies of the gross morphology of *Begonia* flowers have shown that these surfaces have a varied morphological structure in different members of this family. The following initial observations are offered as a preliminary contribution to the study of this situation.

MATERIALS AND METHODS

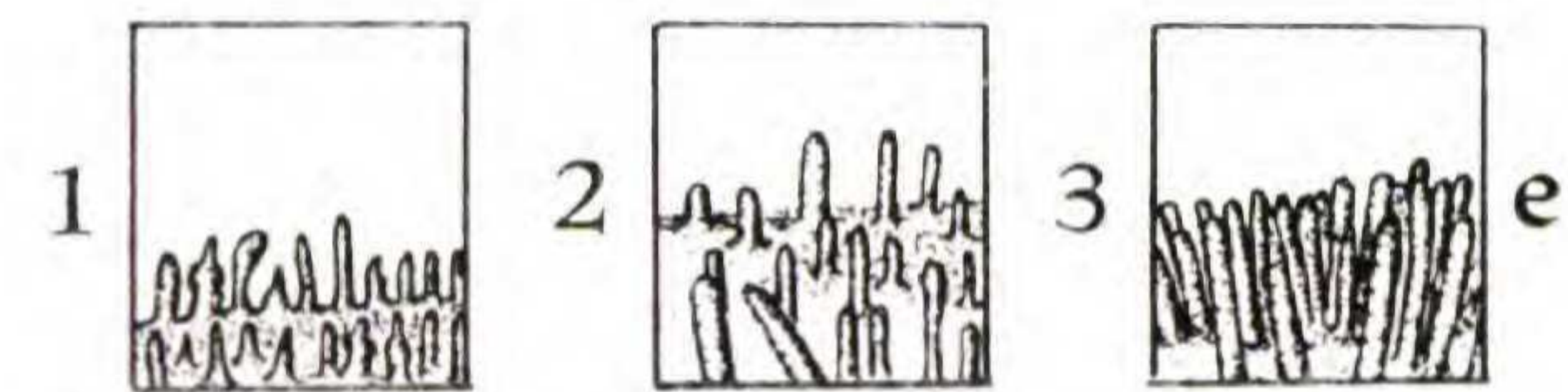
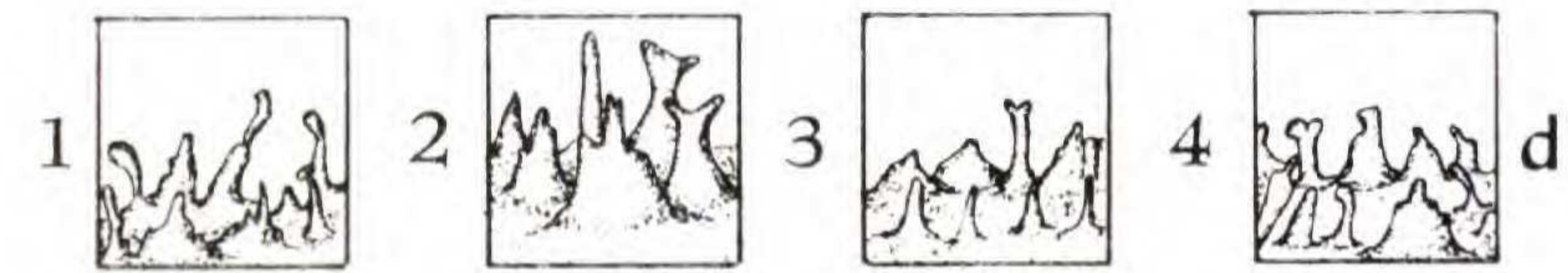
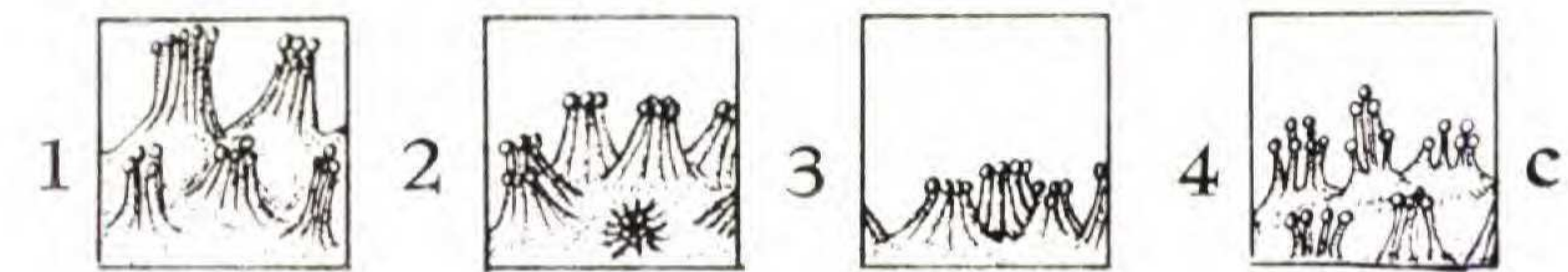
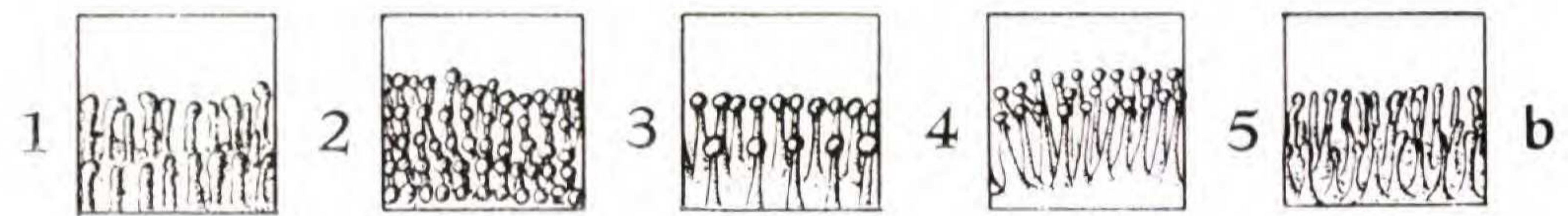
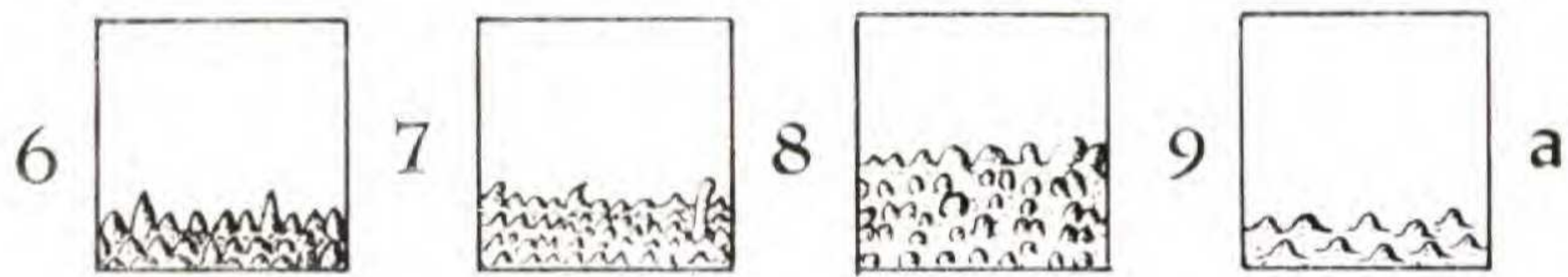
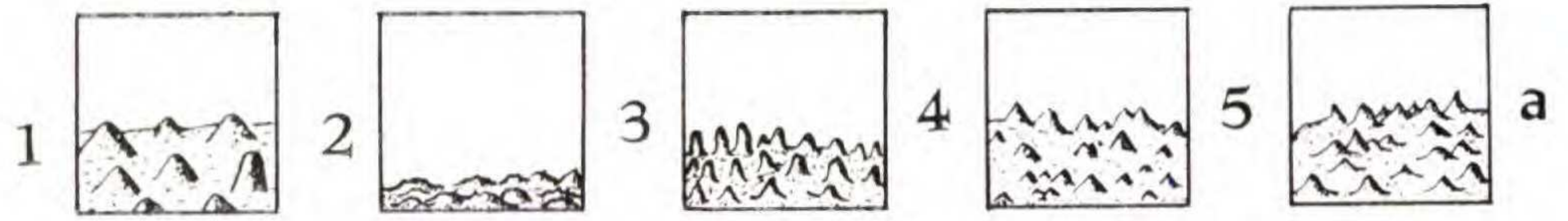
Stigmatic surfaces of twenty-five taxa are noted in this article. The main portion of this group consists of twenty-three species of *Begonia* belonging to sixteen sections. These plants are noteworthy for their rarity but are currently cultivated in greenhouses in the Boston area. Results of the study of stigmatic surfaces of *Begonia roxburghii* A.DC. (sect. *Sphenanthera*) were added to the results of the study of the twenty-three previously mentioned *Begonia* species.

*Begonia* flowers collected in greenhouses were immediately fixed in 70 per cent alcohol. The fixed material was dissected, studied in the laboratory with the help of a dissecting stereo microscope, and subsequent drawings were made.

Wild or native plant material of *Hillebrandia sandwicensis* Oliver was studied by the same method. The flowers of this plant, fixed in 70 per cent alcohol with a few drops of glycerin, were received from Dr. Derral Herbst (Harold L. Lyon Arboretum, University of Hawaii at Manoa, Honolulu, Hawaii). The voucher specimen for the fixed material, *Herbst 5302*, has been deposited in the Herbarium of the Arnold Arboretum.

MORPHOLOGICAL TYPES OF STIGMATIC SURFACES

The structure of a stigmatic surface in each species studied has been carefully checked and sketched (Plate I). I have found that this structure differs significantly among various taxa of the



Begoniaceae. The selected twenty-five species have the following types of stigmatic surfaces which can be arranged in five groups.

- Group *a*. Stigmatic surfaces covered with wart-like, low conical, papillose or nipple-like, fleshy excrescences (9 species).  
 Group *b*. Stigmatic surfaces covered with capitate, glandular hairs (5 species).  
 Group *c*. Same as above, but the capitate, glandular hairs are densely packed into conical, pyramid-like piles (4 species).  
 Group *d*. Stigmatic surfaces covered with irregularly shaped, fleshy, pinnacle-like excrescences (4 species).  
 Group *e*. Stigmatic surfaces covered with fleshy, rod-like excrescences (3 species).

Each of the five types is not restricted to any particular section. Plants from different sections, and even genera, can belong to the same grouping. For example, Group *a* is formed by plants from *Begonia* and *Hillebrandia*, and the *Begonia* species are from six different sections.

There is a certain degree of variation in the structure of stigmatic excrescences, not only among the separate groups, but also

#### PLATE I. LEGEND

Plate I. Semi-diagrammatic figures of portions of stigmatic surfaces in different members of the Begoniaceae. Each Figure at  $\times 60$ . *a*, Tubercled, papillose or nipple-like excrescences, figures 1-9. 1, *Hillebrandia sandwicensis* Oliver; 2, *Begonia roxburghii* A.DC (Sphenanthera); 3, *Begonia fuchsiaeiflora* A.DC (Casparya); 4, *Begonia convolvulacea* A.DC (Enita); 5, *Begonia monophylla* Pavon ex A.DC (Huszia); 6, *Begonia acida* Vellozo (Pritzelia); 7, *Begonia echinosepala* Regel (Pritzelia); 8, *Begonia vitifolia* Schott in Spr. (Pritzelia); 9, *Begonia floccifera* Beddome (Reichenheimia). *b*, Capitate, glandular hairs, figures 1-5. 1, *Begonia egregia* N.E. Brown (Tetrachia); 2, *Begonia herbacea* Vellozo (Trachelocarpus); 3, *Begonia boisiana* Gagnep. (Petermannia); 4, *Begonia foliosa* H.B.K. (Lepsia); 5, *Begonia franconis* Liebm. (Doratometra). *c*, Capitate, glandular hairs densely packed into piles, figures 1-4. 1, *Begonia pustulata* Liebm. (Weilbachia); 2, *Begonia goegoensis* N.E. Brown (Reichenheimia); 3, *Begonia schmidtiana* Regel (Begonia); 4, *Begonia cucullata* Willd. var. *hookeri* Smith & Schub. (Begonia). *d*, Irregularly shaped, pinnacle-like excrescences, figures 1-4. 1, *Begonia boliviensis* A.DC (Barya); 2, *Begonia dipetala* R. Graham in Hooker (Haagea); 3, *Begonia sudjanae* Jansson (Reichenheimia); 4, *Begonia mannii* Hook. f. (Tetraphila). *e*, Rod-like excrescences, figures 1-3. 1, *Begonia epipsila* Brade (Pritzelia); 2, *Begonia maculata* Raddi (Gaerdia); 3, *Begonia pseudo-lubbersii* Brade (Begonia).

within each one of the groups (Plate I). For example, in Group *a* the excrescences may be low, with a rugged outline (*Begonia roxburghii* A.DC, Plate I, Figure 2a), or they may be conical and smooth (*B. convolvulacea* A.DC, Plate I, Figure 4a and *B. monophylla* Pavon ex A.DC, Plate I, Figure 5a). In certain cases excrescences may be elongated (*B. fuchsiaeiflora* A.DC, Plate I, Figure 3a), or wart-like, rounded (*B. vitifolia* Schott in Spr., Plate I, Figure 8a).

In the first, second and fifth groups it appears that transitional forms of stigmatic excrescences can be detected. For example, in *Begonia echinosepala* Regel (Plate I, Figure 7a) some of the excrescences tend to attain a rod-like form although the majority of them are conical and papillose. In *B. franconis* Liebm. (Plate I, Figure 5b) stigmatic excrescences have an intermediate shape between rod-like and capitate hair-like forms, and in *B. epipsila* Brade (Plate I, Figure 1e) some of the excrescences tend to attain either a nipple-like or an irregular, pinnacle-like shape, although the majority of them seem to be rod-like.

#### CONCLUSION

My observations on the morphology of stigmatic surfaces in the Begoniaceae indicate that much work remains to be done to complete this study. The observations described in preceding paragraphs have been made on a very small scale, with meager materials and with some very simple equipment. Understandably, the results of this study must be verified. Further study of the types of excrescences on stigmatic surfaces of the Begoniaceae must be carried out with the help of better instruments and on a larger scale. As many species and genera as possible should be covered by a follow-up study. Furthermore, it might be expedient to begin the study of the developmental patterns of the stigmatic surfaces in different species and genera of the Begoniaceae.

An additional and very interesting topic related to this research project might be the study of stigmatic surfaces in *Begonia* hybrids in order to discover whether their stigmatic surfaces display a combination of traits of parent species or if they follow the structural pattern of one of the parent taxa. The real turning point in morphological study of the stigmatic surfaces in the Begoniaceae will be their study and photographing with the help of a scanning microscope. Only by such a study will these structures be well documented, and their taxonomic value, if any, be discovered.

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